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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,362	06/09/2006	Shigeyuki Hamayoshi	Q95337	5666

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EXAMINER	
AFZALI, SARANG	

ART UNIT	PAPER NUMBER
3726	

NOTIFICATION DATE	DELIVERY MODE
12/09/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/596,362	HAMAYOSHI ET AL.	
	Examiner	Art Unit	
	SARANG AFZALI	3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *election filed 9/14/2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) *2-4* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 5-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20091117, 20060621, 20060609*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Species A, claims 1 and 5-12 in the reply filed on 9/14/2010 is acknowledged.

Claim Objections

2. Claim 5 is objected to because of the following informalities:

In line 2, the phrase "claims 1, wherein" should read - - claim 1, wherein - -.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1 and 5-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 1-2, the limitation of comprising a hollow body brought into contact with a steel strip" is confusing and unclear as if the Applicant is claiming a roller with the claimed structure or is claiming a an assembly of a roller with a strip of steel material?

Claim 9 recites the limitations "the inner diameter Sb" in line 2 and "the inner diameter Sa" in lines 2-3. There are insufficient antecedent basis for these limitations in the claim.

Claim 10 recites the limitations "the end of each small-diameter region" in lines 3-4 and "the inner end of said shaft portion in line 4. There are insufficient antecedent basis for these limitations in the claim.

Claim 11 recites the limitations "the effective length Ls" and "the outer diameter D_L" in line 2. There are insufficient antecedent basis for these limitations in the claim.

Claim 12 recites the limitations "the outer diameter S_{out}" and "the outer diameter Ds" in lines 2-3. There are insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by Imamura et al. (2002/0164475 A1) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Imamura et al. in view of Hamayoshi (JP 2002286397 A).

As applied to claim 1, Imamura et al. teach that sink rolls/support rolls and shafts are made of silicon nitride for their high thermal conductivity (paragraph [0093], lines 1-19) and a surface roughness of up to 20 μm (paragraph [0044], lines 1-3).

Regarding the limitation of thermal conductivity of 50 W/(m.K) or more at room temperature, it is inherent that the silicon nitride roll of Imamura et al. possesses the claimed thermal conductivity since they are both the same materials.

Alternatively, if the Applicant' believes that Imamura et al. do not teach the claimed thermal conductivity, Hamayoshi teaches that it is well known in the art to make tubular element used in a high temperature environment from silicon nitride with a thermal conductivity at the ambient temperature of 70 W/(m.K) (solution, lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided the silicon nitride roll of Imamura et al. with a thermal conductivity of 70 W/(m.K) as taught by Hamayoshi considering its well-known properties of high corrosion resistance and high strength under high temperature environment.

8. Claims 1, 5 and 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kass et al. (US 6,589,048) in view of Imamura et al. (2002/0164475 A1) and Hamayoshi (JP 2002286397 A).

Kass et al. teach a hollow body with shaft portions connected to the said body capable of operating at elevated temperature (col. 1, lines 7-10, Fig. 4).

However, Kass et al. do not explicitly teach the claimed thermal conductivity and surface Imamura et al.

Imamura et al. teach that sink rolls/support rolls and shafts (used in high temperature environments) are made of silicon nitride for their high thermal conductivity (paragraph [0093], lines 1-19) and a surface roughness of up to 20 μm (paragraph [0044], lines 1-3).

Hamayoshi teaches that it is well known in the art to make tubular element used in a high temperature environment from silicon nitride with a thermal conductivity at the ambient temperature of 70 W/(m.K) (solution, lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time of invention to have made the roll of Kass et al. from the silicon nitride material having the surface roughness of up to 20 μm as taught by Imamura et al,. as an effective means of providing a roller with a desired surface finish suitable for contact with the marking particles (Kass et a., col. 3, lines 4-9) while being highly resistant to the operating temperature.

It would have been further obvious to one of ordinary skill in the art at the time of invention to have provided the roll of Kass et al. with the silicon nitride material having a high thermal conductivity at the ambient temperature of 70 W/(m.K) as taught by Hamayoshi considering its well-known properties of high corrosion resistance and high strength under high temperature environment.

The limitations of "a roll for use in a galvanizing pot" in claim 1 has not been given patentable weight because a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In the instant application, the structure of Kass et al. as modified by Imamura et al. and Hamayoshi is capable of performing the intended use and as such, reads on the claimed limitations.

The limitation of "a roll for use in a galvanizing pot" in claim has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

As applied to claim 5, Kass et al./Imamura et al./Hamayoshi teach the invention cited. Kass et al. further teach the roll wherein the inner surface of said body comprises large-diameter regions on both sides and a small-diameter region in the center, and each of said shaft portions has a small- diameter portion, a flange and a large-diameter portion, the large-diameter region of said body being connected to the large-diameter portion of said shaft portion.

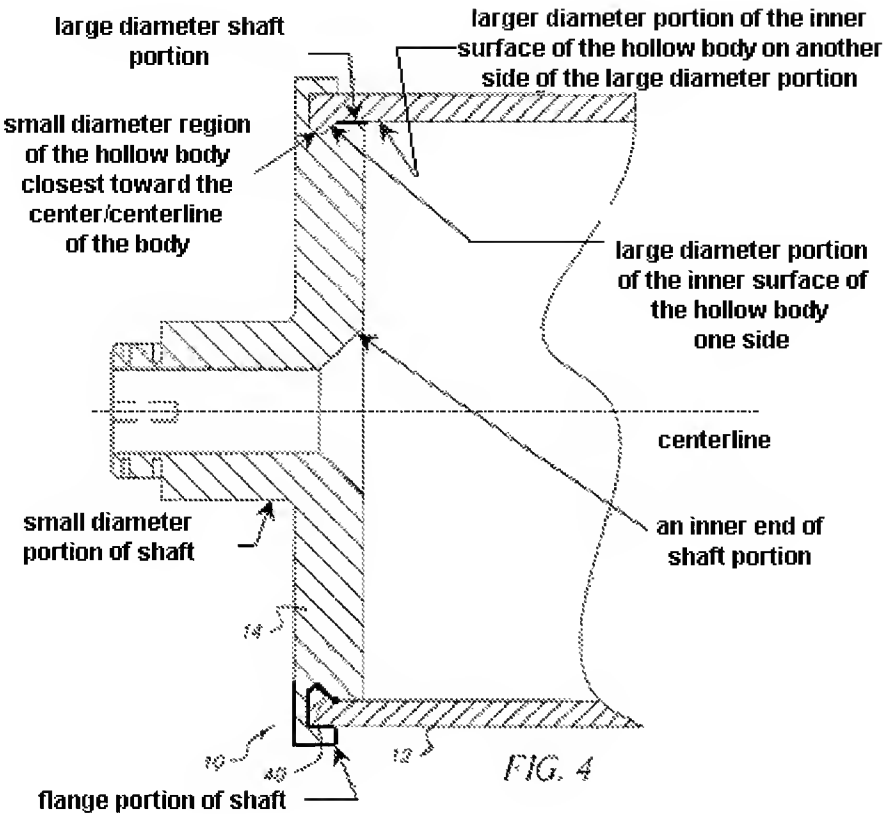

FIG. 4

As applied to claim 7, Kass et al./Imamura et al./Hamayoshi teach the invention cited. Kass et al. further teach the roll wherein each large-diameter region of said body is shrink-fit to the large-diameter portion of each shaft portion (Fig. 4 above, col. 4, lines 7-10).

As applied to claims 9, 10 and 12, Kass et al./Imamura et al./Hamayoshi teach the invention cited. Kass et al. further teach the roll wherein a ratio of the inner diameter of each small-diameter region of said body to the inner diameter of each large-diameter region of the body is 0.9 or more and less than 1.0 (as in claim 9 shown in Fig. 4 above); that the large-diameter region of said body is longer than the large- diameter

portion of said shaft portion, so that there is a gap between the end of each small-diameter region of said body and the inner end of said shaft portion (as in claim 10 shown in Fig. 4 above) and that a ratio of the outer diameter of said body to the outer diameter of the small-diameter portion of each shaft portion is 2-10 (as in claim 12 shown in Fig. 4 above).

As applied to claim 8, Kass et al./Imamura et al./Hamayoshi teach the invention cited. Kass et al. (Fig. 4 above) further teach a shrink-fit connection between the shaft portion and the hollow body. However, the limitation of "shrink fitting ratio in a range of 0.01/1000 to 0.5/1000" is not given any patentable weight since both claims 7 and 8 are considered product-by-process claims and this product by process limitation is already taught by the structure of Kass et al./Imamura et al./Hamayoshi and this extra limitation of the shrink fit ratio does not have any effect on the overall structure. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of invention to have selected the claimed shrink fit ratio range to the roll of Kass et al./Imamura et al./Hamayoshi in order to provide an effective and secured shrink fit connection of the parts without subjecting the joint to any extra stresses.

As applied to claim 11, Kass et al./Imamura et al./Hamayoshi teach the invention cited. Kass et al. (Fig. 4 above) further teach a ratio between the effective length to the outer diameter of the large-diameter portion of each shaft portion but do not explicitly teach the claimed range.

However, it is noted that the effective ratio between length to the outer diameter of the large-diameter portion of each shaft portion of the roller is a result-effective variable because it is well-known in the art of fabricating rollers, that depending on the length of the end shaft part and its ratio with the outer diameter of the shaft part, the shaft portion would have enough contact surface area for a more effective and secured engagement in the end of the hollow tube. As such, it would have been obvious to one of ordinary skill in the art at the time of invention to have selected the claimed ratio of 0.5-2.0 for the ratio between the effective length to the outer diameter of the large-diameter portion of each shaft portion dependent on the desired contact surface area with the inner surface of the hollow tube, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kass et al. in view of Imamura et al. and Hamayoshi as applied to claim 5 above, and further in view of Tanaka et al. (JP 04017928 A).

As applied to claim 8, Kass et al./Imamura et al./Hamayoshi teach the invention cited including the connecting shaft portions to both end portions of the hollow body but do not explicitly teach the plurality of longitudinal grooves extending through the large diameter portion and the flange portion of the shaft.

However, Tanaka et al. teaches a roll wherein the total contact surface area of the shaft portion (Fig. 2(A)) which is inserted into the end of the hollow pipe is knurled

with longitudinal grooves (2c) forming apertures communicating with the inside of the roll allowing an accurate, secure and effective engagement with the inner surface of the hollow pipe resulting in a strong joint.

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided the total contact surface area of the shaft portion (including the large diameter and the flange portions as in Fig. 4 above) of Kass et al./Imamura et al./Hamayoshi as taught by Tanaka et al. as an effective means of accurately engaging the joining surfaces of the shafts with the inner surfaces of the hollow body resulting in an enhanced and secured connection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARANG AFZALI whose telephone number is (571)272-8412. The examiner can normally be reached on 7:00-3:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SARANG AFZALI/
Examiner, Art Unit 3726
12/5/2010